

AMENDMENT TO THE CLAIMS:

This listing of claims will replace all prior versions of claims in the application:

LISTING OF CLAIMS:

1 (currently amended) A magnetic sensor, comprising
2 a first magnetic shield layer, having a raised portion and first and second
3 laterally opposed recessed portions extending laterally there from;
4 a magnetoresistive sensor formed above said raised portion of said first
5 magnetic shield layer, said magnetoresistive sensor having an anti-parallel
6 coupled self pinned layer, and having a free magnetic layer;
7 first and second compressive layers formed above said first and second
8 recessed portions of said shield layer; and
first and second hard magnetic bias layers formed above said first and second
compressive layers; and
third and fourth compressive layers comprising Rh formed above said first and
second hard bias layers.

1 2. (Original) A magnetic sensor as in claim 1, wherein said anti-parallel pinned
2 layer includes first and second ferromagnetic layers having a positive
3 magnetostriction separated by anti-parallel coupling layer, and wherein pinning of
4 said self pinned layer is assisted by a combination of magnetostriction and
5 magnetostatic coupling between said first and second ferromagnetic layers.

- 1 3. (Original) A magnetic sensor as in claim 1, wherein said self pinned layer is
2 pinned without the assistance of exchange coupling to an antiferromagnetic
3 material.
- 1 4. (Cancelled)
- 1 5. (Cancelled) A magnetic sensor as in claim 1 further comprising first and second
2 layers of hard magnetic material formed over said first and second compressive
3 layers, and first and second metallic layers formed over said first and second
4 layers of hard magnetic material.
- 1 6. (currently amended) A magnetic sensor, comprising
2 a first magnetic shield layer, having a raised portion and first and second
3 laterally opposed recessed portions extending laterally there from;
4 a magnetoresistive sensor formed above said raised portion of said first
5 magnetic shield layer, said magnetoresistive sensor having an anti-parallel
6 coupled self pinned layer, and having a free magnetic layer;
7 first and second compressive layers formed above said first and second
8 recessed portions of said shield layer;
9 first and second layers of hard magnetic material formed over said first and
10 second compressive layers; and

11 first and second metallic layers comprising Rh formed over said first and
12 second layers of hard magnetic material.

1 7. (currently amended) A magnetic sensor as in claim 1 further comprising first and
2 second hard magnetic layers formed above said recessed portions of said shield
3 layer, said first and second hard magnetic ~~material~~ layers comprising CoPt, and
4 further comprising first and second CrMo seed layers.

1 8. (currently amended) A magnetic sensor as in claim 1 further comprising first and
2 second hard magnetic layers formed above said recessed portions of said shield
3 layer, said first and second hard magnetic ~~material~~ layers comprising CoPtCr and
4 further comprising first and second Cr seed layers.

1 9. (Original) A magnetic sensor as in claim 1 wherein said first and second
2 compressive layers each have a thickness of at least 200 angstroms.

1 10. (Original) A magnetic sensor as in claim 1 wherein said first and second
2 compressive layers each have a thickness of at least 750 angstroms.

1 11. (Original) A magnetic sensor as in claim 1 further comprising an insulating layer
2 disposed between said anti-parallel pinned layer and said free magnetic layer.

- 1 12. (Original) A magnetic sensor as in claim 1 further comprising an electrically
2 conductive layer disposed between said anti-parallel pinned layer and said free
3 magnetic layer.
- 1 13. (currently amended) A magnetic sensor as in claim 2 + wherein said first and
2 second ferromagnetic layers comprise a material having a positive
3 magnetostriction.
- 1 14. (Original) A magnetic sensor as in claim 1 wherein said shield layer is in
2 electrical communication with said anti-parallel pinned layer.
- 1 15. (Original) A magnetic sensor as in claim 1 further comprising an electrically
2 insulating layer disposed between said shield and said anti-parallel pinned layer.
- 1 16. (currently amended) A magnetic sensor as in claim 2 + wherein at least one of
2 said ferromagnetic layers of said pinned layer comprises CoFe.
- 1 17. (Original) A magnetic sensor as in claim 1 wherein said first and second
2 compressive layers have a thickness of at least 17 angstroms.
- 1 18. (Cancelled)
- 1 19. (Cancelled)

1 20. (currently amended) A data storage system, comprising:
2 a housing
3 a motor connected with said housing;
4 a spindle connected with said motor;
5 a magnetic disk supported upon said spindle for rotation about its own axis;
6 an actuator; and
7 a slider supported by said actuator for pivotal motion across a surface of said disk;
8 a magnetic sensor formed on said slider, said magnetic sensor comprising:
9 a first magnetic shield layer, having a raised portion and first and second
10 laterally opposed lower portions extending laterally there from;
11 a magnetoresistive sensor formed above said raised portion of said first
12 magnetic shield layer, said magnetoresistive sensor having an anti-parallel
13 coupled self pinned layer, and having a free magnetic layer; and
 a first and second compressive layers comprising Rh formed above said first
 and second laterally opposed lower portions of said shield layer.

1 21. (currently amended) A magnetic sensor, comprising
2 a first magnetic shield layer, having a raised portion and first and second
3 laterally opposed recessed portions extending laterally there from;
4 a magnetoresistive sensor formed above said raised portion of said first
5 magnetic shield layer, said magnetoresistive sensor having an anti-parallel
6 coupled self pinned layer, and having a free magnetic layer; and

7 first and second compressive layers comprising Cu formed above said first
8 and second recessed portions of said shield layer.

1 22. (currently amended) A magnetic sensor, comprising
2 a first magnetic shield layer, having a raised portion and first and second
3 laterally opposed recessed portions extending laterally there from;
4 a magnetoresistive sensor formed above said raised portion of said first
5 magnetic shield layer, said magnetoresistive sensor having an anti-parallel
6 coupled self pinned layer, and having a free magnetic layer; and
7 first and second compressive layers comprising Rh formed above said first
8 and second recessed portions of said shield layer.